भारतीय मानक
Indian Standard

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बच्चों को दूध पिलाने की काँच की बोतल — विशिष्टि

(पहला पुनरीक्षण)

Glass Feeding Bottles — Specification

(First Revision)

ICS 55.100

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भारतीय मानक ब्यूरो
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Glass, Glassware and Laboratoryware Sectional Committee, CHD 10

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Glass, Glassware and Laboratoryware Sectional Committee had been approved by the Chemical Division Council.

Taking into consideration the importance of feeding bottles and their almost universal use in feeding infants, the committee decided to formulate this standard in 1969. This standard recommends designs of glass feeding bottles which can be easily cleaned and sterilized and to which rubber teats can either be slipped on of secured with a metallic of plastic screw closure for providing a leak proof grip.

Section 11(2) of *The Infant Milk Substitutes, Feeding Bottle and Infant Foods (Regulation of Production, Supply and Distribution) Act*, 1992 states that ‘No person shall sell or otherwise distribute any feeding bottle unless it conforms to the Standard Mark specified by the Bureau of Indian Standards referred to in sub-section (1) for feeding bottles and such mark is affixed on its container’. The Act has been subsequently amended as *The Infant Milk Substitute, Feeding Bottles and Infant Foods (Regulation of Production, Supply and Distribution) Amendment Act, 2003*. As per section 2(c) of this Act, ‘feeding bottle’ means any bottle or receptacle used for the purpose of feeding infant milk substitutes, and includes a teat and a valve attached or capable of being attached to such bottle or receptacle.

The committee decided to revise this standard in view of the technological and design changes. In this revision, requirements for material and limit of alkalinity have been modified, as well as, the test method for permanency of pigment. New requirements for content and migration of heavy elements have been added in view of health and safety of infant.

Teats and caps are adjuncts to glass feeding bottles. Rubber teats shall conform to IS 3565, and in case teats are made of silicone, these shall be manufactured from non-toxic and food grade material till, such time Indian Standard is available on the subject. Caps (metal or plastic) shall be manufactured from food grade material.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed of calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

GLASS FEEDING BOTTLES — SPECIFICATION

(First Revision)

1 SCOPE

This standard specifies the requirements and methods of sampling and test for glass feeding bottles. This standard does not cover the requirements for rubber teats and plastic or metallic closures required for these bottles.

2 REFERENCES

The standards given below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards:

IS No.	*Title*
IS 376 : 1986	Specification for sodium hydroxide, analytical reagent (*third revision*)
IS 573 : 1992	Trisodium phosphate — specification (*fourth revision*)
IS 1070 :1992	Reagent grade water — Specification (*third revision*)
IS 1382 : 1981	Glossary of terms relating to glass industry (*first revision*)
IS 2303 (Part 1/ Sec 1) : 2012	Grading glass for alkalinity: Part 1 Hydrolytic resistance, Section 1 Hydrolytic resistance of glass grains at 98°C (*second revision)*
IS 3565 : 1966	Rubber teats for feeding bottles
IS 14625: 2015	Plastic feeding bottles (*first revision*)

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 1382 and IS 14625 shall apply.

4 TYPES

The bottles shall be of suitable design for users and its shape and required dimensions shall facilitate the use of the bottle without any difficulties, as well as, shall not cause any detrimental effect to the infant.

5 REQUIREMENTS

5.1 Material

5.1.1 The bottle shall be made from borosilicate glass.

5.1.2 The content of heavy metals like an arsenic, antimony, chromium, mercury, lead, cadmium, barium and selenium shall not be more than 100 ppm in total in glass feeding bottles, when tested by an instrumental method like X-ray fluorescence.

5.2 Description

The feeding bottle shall be of suitable design, shape and required dimensions as prevalent in use. However, the shape shall be such, that it is easily cleanable and does not permit the food remnants to remain stuck inside the feeding bottles. Neck shall be smooth from inside, that is, solid without any underside grooves.

5.2.1 *Manufacture, Workmanship, Finish and Appearance*

5.2.1.1 The bottles shall be manufactured by a suitable process adhering to good manufacturing practice (GMP).

5.2.1.2 The body of the bottle shall be colourless, smooth, both internally and externally, no sharp angles and joints, free from any visual defects like hooks, embedded foreign matters, detrimental bubbles, pits etc.

5.3 Capacity

The bottles shall be manufactured in nominal capacity of 120 ml, 200 ml and 240 ml or any other capacity as demanded in the market. The brimful capacity shall exceed the nominal capacity by a minimum of 15 percent.

5.4 Types, Dimensions and Wall Thickness

The feeding bottle shall be of suitable design, shape and required dimensions as prevalent in use. The following three types as illustrated are recommended based on design and application of accessories along with bottles. The dimensions and design indicated are recommendatory in nature to guide the manufacturers and the end users:

a) Type 1 — With finish having one or two parallel rings to permit the rubber teat to be slipped on to provide a leak proof grip.

b) Type 2 — With finish having screw threads to permit the rubber teat to be secured with the help of a plastic or metallic closure to make it leak proof.

c) Type 3 — With opening at both ends.

The minimum wall thickness shall be declared by the manufacturer in view of safety aspect.

5.5 Scale and Graduations

All feeding bottles shall be marked with graduations, in millilitres. If required, the feeding bottles may also be marked with graduations in any other units. The feeding bottles shall be provided with following capacity scale:

a) The scale interval and the maximum indicating scale mark shall be declared by the manufacturer. However, the minimum scale mark and interval marking shall not be more than 20 percent of the maximum scale indicating mark.

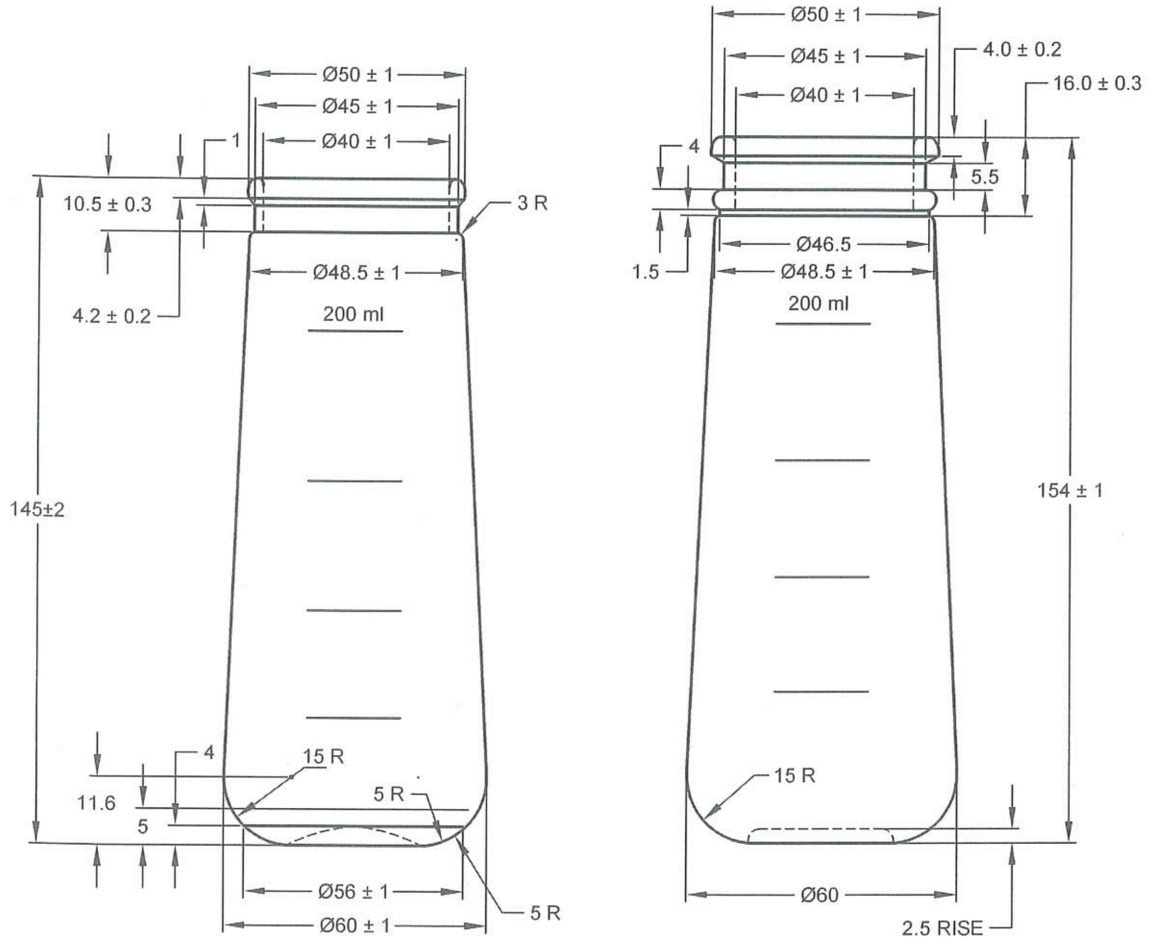
b) The scale marks and the indicating numerical values shall be clear and shall not be affected by high temperature during sterilizing treatment. Marking shall be either embossed or printed by screen printing on outside of the bottle and shall also indicate the nominal capacity in millilitres. In case of printed scale, the printing should be done with Applied Ceramic Labelling (ACL), or any other ink free from heavy metals. The feeding bottles shall be tested for the permanency of pigment by method as prescribed in Annex A.

5.6 Limit of Alkalinity

When graded according to the method prescribed in IS 2303 (Part 1/Sec 1), the material shall conform to Class HGB 1 or HGB 2 of glass.

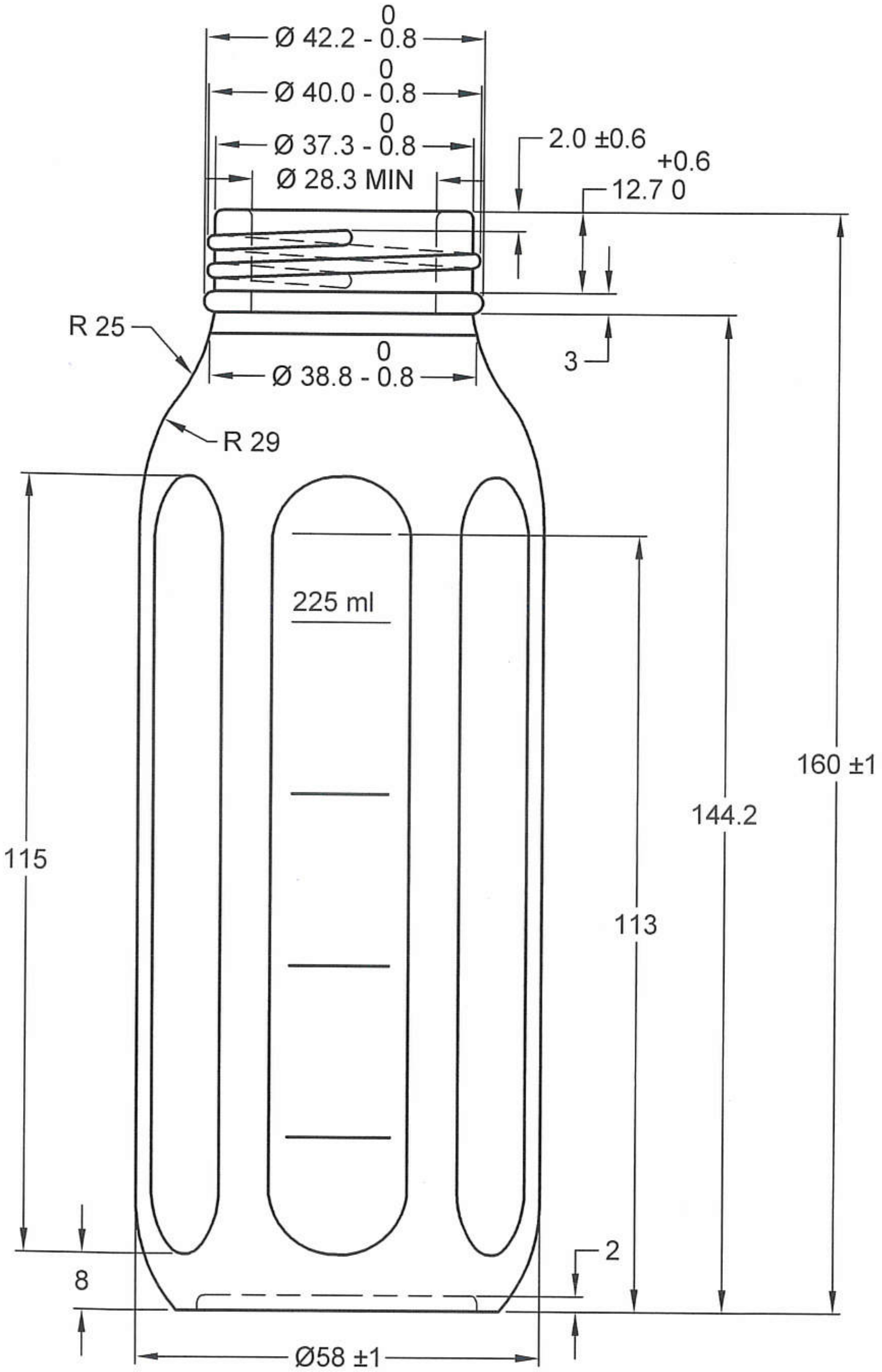
5.7 Thermal Shock Resistance

The bottles shall pass the test prescribed in Annex B.



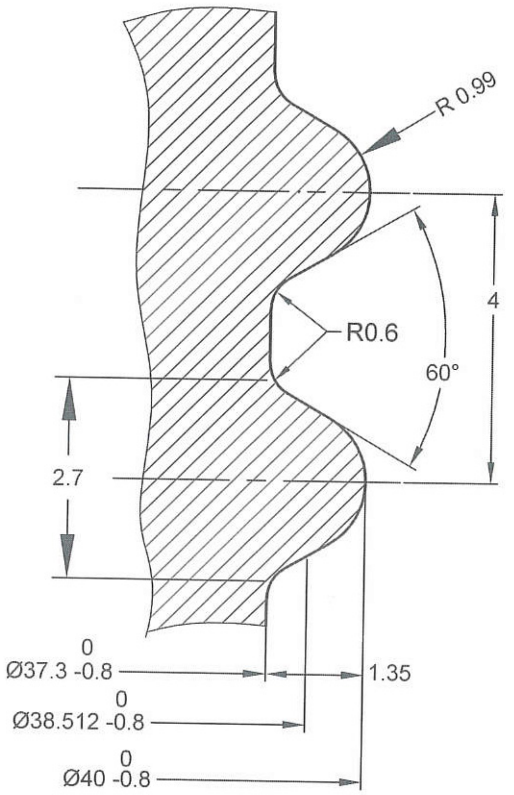
All dimensions in millimetres.

Fig. 1 Glass Feeding Bottle, Type 1



All dimensions in millimetres.

FIG. 2 GLASS FEEDING BOTTLE, TYPE 2



All dimensions in millimetres.

FIG. 3 DETAIL OF SCREW THREAD FOR FINISH OF TYPE 2 FEEDING BOTTLE

5.8 Migration of Heavy and Toxic Elements

For determining the migration of heavy and toxic elements, listed in **5.1.2**, method prescribed at Annex C shall be followed, and the amount of each of these elements leached out shall be reported. No leaching of these elements (*see* **5.1.2**) is permitted from the glass feeding bottle.

6 PACKING AND MARKING

6.1 Packing

The bottles shall be packed carefully, so as to protect it from damage during handling and transit.

6.2 Marking

6.2.1 Each bottle shall be permanently and legibly marked with scale mark and nominal capacity, in ml. Each carton containing the bottle shall be permanently and legibly marked with the following, in a location where it is accessible and visible:

a) Indication of the source of manufacture and trade-mark;
b) Type of material of glass;
c) Nominal capacity;
d) Batch number and, code number;
e) Month and year of manufacture; and
f) Instructions for use and hygienic care of the product as given in **6.2.2** shall be printed in English/Hindi/regional language and may be included in a separate leaflet placed in or on the product**.**

6.2.2 *Instructions for Use*

6.2.2.1 The following information shall be provided:

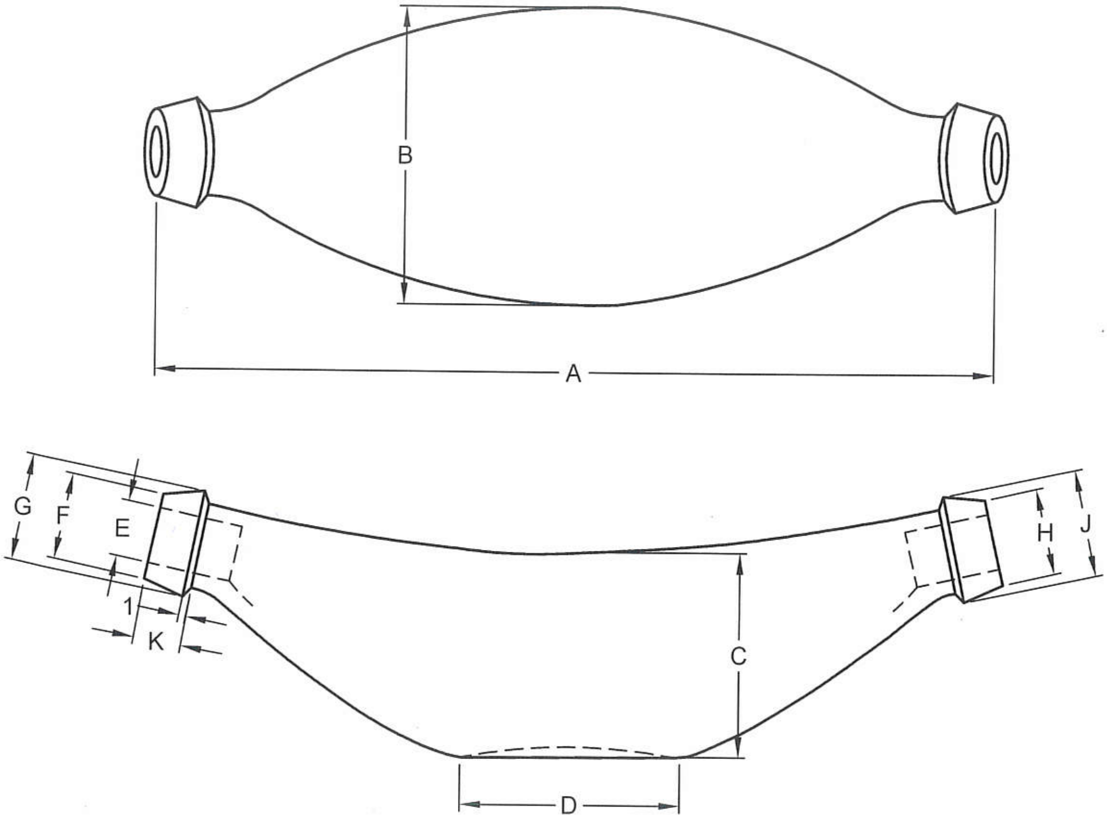
a) Information for the safe use of the product;
b) Information on unsuitable common methods of heating which might damage the product; and
c) Suitability of the bottle for use in microwave oven.

The following additional **Warning** may be provided in the form given:

Breakable Glass Bottles — HANDLE WITH CARE

6.2.2.2 For re-usable products the following additional instructions shall be provided:

a) at least one method of cleaning;
b) before use, clean the product; and
c) information on unsuitable common methods of cleaning, storage and use, which might damage the product.



SL. NO.	NOMINAL CAPACITY	A	B	C	D	E	F	G	H	J	K
1	200ml	200	72	48	57	13	20	25	20	26	11
2	100ml	162	55	43	38	11	17	20	20	23	6

All dimensions in millimetres.

FIG. 4 GLASS FEEDING BOTTLE, TYPE 3

6.2.2.3 For products with feeding accessories the following warnings shall be provided in the form as given:

For your child's safety and health

WARNING !

a) Always use this product under adult supervision;

b) Always check food temperature before feeding; and

c) Keep all components not in use out of the reach of children.

NOTE — It is recommended that the supplier of feeding bottle include informative literature to explain the reasons and background for these warnings.

6.2.2.4 Any other information which may be useful for the user may also be indicated as per weights and measures and government regulations.

6.2.3 *BIS Certification Marking*

The bottles may also be marked on their surface with the Standard Mark.

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act,* 2016 and the Rules and Regulations made thereunder. Details of the conditions under which the licence for use of the Standard Mark may be granted to manufacturers or producers, may be obtained from the Bureau of Indian Standards.

7 SAMPLING

Representative samples of the bottles shall be drawn and the criteria for conformity determined as prescribed in Annex D.

ANNEX A

(*Clause* 5.5)

TEST FOR PERMANENCY OF PIGMENT

A-1 EQUIPMENTS

A-1.1 Stainless steel tank with temperature controller and stirrer.

A-1.2 Water cooled diamond cutter saw.

A-2 TEST SOLUTION

The solution shall have the following composition:

a) Sodium hydroxide (NaOH) — 9.1 percent (*see* IS 376).
b) Trisodium phosphate ($Na_3PO_4 \cdot 12H_2O$) — 0.9 percent (*see* IS 573).
c) Distilled water — 90 percent (*see* IS 1070).

A-2.1 Measure the water and pour it into the mixing vessel.

A-2.2 Weigh the sodium hydroxide, and then add it slowly to the distilled water while stirring the water in the mixing vessel.

A-2.3 Stir until the sodium hydroxide is well dissolved, and the solution is homogeneous.

A-2.4 Weigh the trisodium phosphate and, then add it slowly to the distilled water while stirring the water in the mixing vessel.

A-2.5 Stir until the trisodium phosphate is well dissolved and the solution is homogeneous.

A-3 PROCEDURE

A-3.1 Take 6 sample bottles at random from the lot. Cut all 6 bottles with water cooled diamond saw cutter from bottom sides, for easy placement of printed area of the bottle into solution beakers.

A-3.2 Place the samples into glass beakers containing test solution (*see* **A-2**), so that lower half of the Applied Ceramic Labeling (ACL) printing is immersed into the solution. Cover the beaker mouth with aluminum foil.

A-3.3 Place the beakers into water bath having temperature in such a way that the solution temperature inside beaker is maintained 31 ± 0.5°C.

A-3.4 After 8 h, remove the samples and gently rinse with tap water.

A-3.5 Compare the immersed portion of ACL with non-immersed portion and observe the printing removal.

A-3.6 The immersed area should exhibit opaqueness. The loss of gloss is expected and acceptable.

A-3.7 The printing on bottles can be graded as follows:

a) Poor — Severe delamination and severe loss in opacity.
b) Fair — Moderate loss in opaqueness.
c) Good — Slight loss in opaqueness.
d) Excellent — No loss of opaqueness.

A-3.8 Bottles having Poor and Fair grade shall be rejected.

ANNEX B

(*Clause* 5.7)

TEST FOR THERMAL SHOCK RESISTANCE

B-1 PRINCIPLE

The bottles are subjected to a sudden change of temperature and examined for any cracks or damage.

B-2 APPARATUS

B-2.1 Cold Water Bath

The cold water bath shall comprise of a bath or tank capable of containing at least 8 l of water, for each kilogram of glass tested at one time. It shall be fitted with a water circulation facility, a thermometer and a thermostatic control capable of maintaining the water temperature to within ± 1°C of a specified lower temperature of 25°C.

B-2.2 Hot Water Bath

The hot water bath shall comprise of a bath or tank capable of containing at least 8 l of water for each kilogram of glass tested at one time. It shall be fitted with a water circulation facility, a thermometer and a thermostatically controlled heater capable of maintaining the water temperature to within ± 1°C of a specified upper temperature of 75°C.

B-2.3 Wire Net Basket

Of such a size as would hold the required number of samples and would be easily immersed, and taken out of the hot and cold water baths.

B-3 PROCEDURE

B-3.1 Place the requisite number of bottles (*see* **D-2.2**) in the basket and immerse in the hot water bath previously heated to 75 ± 1°C in such a way that they get filled with hot water and are completely immersed in it for 15 min. Maintain the temperature of the bath at 75 ± 1°C.

B-3.2 After immersing the bottles in hot water bath for 15 min, immediately transfer the basket containing bottles filled with hot water to the cold water bath maintained at 25 ± 1°C. The process of transferring the basket from hot to cold water bath shall be completed within 10 ± 2 s. The bottles shall be almost completely immersed in the bath, without allowing cold water to enter in the bottle and shall be immersed for 1.5 to 2 min. The basket shall be taken out of the cold bath and the bottles shall be carefully examined visually for any damage.

B-3.3 The bottles shall be taken to have complied with the requirements of this test if the bottles do not chip, crack or break.

NOTE — Bottles used for the purpose of this test shall not be subjected to further testing and shall also not be put into service.

ANNEX C

(*Clause* 5.8)

MIGRATION OF HEAVY AND TOXIC ELEMENTS

C-1 PRINCIPLE

Soluble elements (antimony, arsenic, barium, cadmium, chromium, lead, mercury and selenium) are extracted from the individual components of the glass bottle. Conditions that simulate contact with stomach acid shall be used. The concentrations of the soluble elements are described quantitatively.

C-2 APPARATUS

C-2.1 Water Bath — Able to maintain the temperature of the test mixture at 37 ± 2°C.

C-2.2 *p*H Meter — With an accuracy of ± 0.2 *p*H units.

C-3 REAGENTS

Unless specified otherwise, pure chemicals and distilled water (*see* IS 1070), shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

C-3.1 Hydrochloric Acid Solution — 0.07 ± 0.00 mol/l.

C-3.2 Distilled Water

C-4 PROCEDURE

Fill the bottle with hydrochloric acid solution (*see* **C-3.1**), up to its nominal capacity and close the bottle. The acid solution shall be pre-conditioned to 37 ± 2°C. Care shall be taken so that the acid solution does not come in contact with the closures throughout the test. The bottle containing the acid solution is allowed to stand in water bath (*see* **C-2.1**), (dip up to the level of the acid solution in the bottle) for 60 ± 1 min at 37 ± 2°C.

Immediately after standing, transfer the acid solution to a beaker (thoroughly acid washed and dried). Analyze the acid solution for the amount of individual elements (*see* **5.1.2**) by the methods prescribed in column 4 of Table 1 of IS 14625.

ANNEX D

(*Clause* 7)

SAMPLING AND CRITERIA FOR CONFORMITY FOR GLASS FEEDING BOTTLES

D-1 SCALE OF SAMPLING

D-1.1 Lot

In any consignment all the feeding bottles of the same type, pattern and nominal capacity belonging to the same batch of manufacture shall be separated in groups of 1 000 bottles or less. Each such group shall constitute a lot.

D-1.2 Samples shall be tested from each lot, for ascertaining the conformity of the bottles to the requirements of the specification.

D-1.3 Sample Bottles

The number of bottles to be selected at random from the lots of different sizes for different tests shall be in accordance with Table 1.

D-1.3.1 In order to ensure the randomness of selection, random number tables shall be used. In case such tables are not available, the following procedure is recommended:

Starting from any bottle in the lot, count them 1, 2, 3, , up to *r* and so on. Every r^{th} bottle thus counted shall be chosen, *r* being the integral part of *N/n* (*see* Table 1).

D-2 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

D-2.1 Select two more bottles from the lot at random and test them for alkalinity according to the method given in IS 2303 (Part 1/Sec 1). If any of the bottles fails in the test, the lot shall be rejected without further testing. If both the bottles pass the test, the lot shall be examined for other characteristics.

D-2.2 The number of bottles to be selected from the lot for testing for thermal shock resistance shall be in accordance with column 7 of Table 1.These shall be separately selected apart from those bottles selected under **D-1.3**. There shall be no failures when five bottles are tested and there shall not more than one failure when 10 bottles are tested for accepting the lot in respect of this characteristic.

D-2.3 For Visual and Dimensional Requirements

The lot which has passed alkalinity test and thermal shock resistance test shall then be examined for visual and dimensional characteristics. The number of bottles to be selected for this purpose shall be in accordance with column 3 of Table 1. A bottle failing in one or more of the requirements for these characteristics shall be called a defective.

D-2.3.1 Each of the bottles selected in the first stage in accordance with column 3 of Table 1 shall be examined for visual and dimensional characteristics. If the number of defectives is less than or equal to the corresponding acceptance number *(a),* the lot shall be accepted. If the number of defectives is equal to or greater than the rejection number *(r),* the lot shall be rejected. If it lies between the acceptance number and the rejection number, a second sample of size equivalent to that of the first sample shall be taken

Table 1 Number of Tests and Criteria for Conformity for Different Characteristics

(*Clause* D-1.3.1)

Visual and Dimensional Characteristics						Thermal Shock Resistance Test	
Lot Size	Stage	Sample size	Cumulative Sample	Acceptance No.	Rejection No.	Sample size	Acceptance No.
N		*R*		*a*	*r*		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Up to 150	First	20	20	*	2	5	0
	Second	20	40	1	2		
151 to 500	First	32	32	0	3	5	0
	Second	32	64	3	4		
501 to 1 000	First	50	50	1	4	10	1
	Second	100	100	4	5		

* Acceptance is not allowed at this stage.

to determine the conformity or otherwise of the lot. The number of defectives found in the first and the second sample shall be combined and if the combined number of defectives in the cumulative sample is less than or equal to the corresponding acceptance number, the lot shall be accepted in respect of visual and dimensional characteristics; otherwise it shall be rejected.

D-2.4 In the case of glass feeding bottles with printed scale on them, two bottles shall be selected at random if the lot size is equal to 500 or below and four bottles shall be selected if the lot size is more than 500 in addition to those already drawn under **D-1.3**. These bottles shall be tested for permanency of pigment. The lot shall be deemed acceptable in respect of this characteristic if all the bottles selected above pass the test.

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Amend No.	Date of Issue	Text Affected

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